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Danita Maseles, Esquire
Schlumberger Technology Corporation
Suite 1700
5599 San Felipe
Houston, TX 77056-2722

EXAMINER	
JARRETT, SCOTT L	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/802,622	KLUMPEN ET AL.
	Examiner	Art Unit
	SCOTT L. JARRETT	3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/17/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Non-Final Office Action is in response to Applicant's submission filed March 17, 2004. Currently Claims 1-58 are pending.

Claim Objections

2. Claim 9 is objected to because of the following informalities: Claim 9 recites input Data provided, instead of the intended input data required. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made.to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Primavera Project Planner as evidenced by at least Primavera Project Planner Planning and Control Guide Version 3.0 (1999) in view of Sriramdas, Systems Analysis of Drilling Engineering and Management To Design a Relational Database (1998).

Regarding Claims 1, 11 and 21 Primavera teaches a planning system and method comprising (Figures on Pages 59, 62):

- selecting one or more tasks (activities) in a task manager (Page 62;

- verifying task dependency a proper order of the one or more tasks (Linking Activities with Relationships, Pages 64-66);

- retrieving from a task base (e.g. baseline schedule) one or more sets of instructions associated with the one or more selected and verified tasks (Pages 153, 195, 214);

- retrieving one or more sets of input data (e.g. cost, schedule, timesheet data) associated with the one or more sets of instructions (Pages 8, 176; Figure on Page 7);

- verifying that each set of input data is received by a corresponding one or more sets of instructions (Paragraph 1, Page 9; Paragraph 1, Page 16; Paragraph 1, Page 68);

- executing the one or more sets of instructions ad using the one or more sets of input data during the execution thereby generating a set of results (Pages 235, 239); and

- recording or displaying the results on a device (Pages 187, 235, 239; Figure on Page 7).

While well planning is old and well Primavera does not expressly teach that the intended field of use of the planning system/method is limited to well planning as recited in the *preamble*.

Sriramdas teaches an automatic well planning system and method for drilling engineering and management (Section 2.1.1, Page 7; Figures 3.2, 7.1; Table 7.6) in an analogous art of project management for the purpose of (successfully) managing the plurality of tasks, resources and personnel required in drilling engineering and management (i.e. oil well drilling; Paragraph 1, Page vi; Paragraph 1, Page 5; Paragraph 2, Page 7).

More generally Sriramdas teaches a plurality of the old and very well known well planning (e.g. drilling engineering and management) tasks and their associated data and algorithms (input/output data, results, logical expressions/equations) including but

not limited to (Table 5.1): bit selection (Section 5.4.8, Page 59) and drillstring design (Section 5.3.13, Page 65)

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, with its ability to be applied to any of a plurality of industries, project types or the like, would have utilized to manage/plan a well planning (oil drilling, drilling engineering) project in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

It is noted that generally a preamble is not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

However in an attempt to further prosecution the examiner assumes applicant's will amend the claims to include a positive recitation of the well planning system/method's management of well planning specific tasks.

Regarding Claims 2, 7, 12, 17, 22 and 27 Primavera teaches a planning system and method wherein one or more of the selected tasks includes at least one of the following (selected from the group consisting of): risk assessment (Paragraphs 1, 3-4, Page 40; Page 79), bit selection or drillstring design.

It is noted that the various tasks merely represents non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks being 'managed' by the planning system. Further, the structural elements remain the same regardless of the specific tasks being 'managed' by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 3, 8, 13, 18, 23 and 28 Primavera teaches a planning system and method wherein the instructions include at least one of the following (selected from the group consisting of) algorithms/logical expressions: risk assessment (Paragraphs 1, 3-4, Page 40; Page 79), bit selection, or drillstring design.

It is noted that the various algorithms associated with the tasks merely represents non-functional descriptive material and are not functionally involved in the

steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks being 'managed' by the planning system. Further, the structural elements remain the same regardless of the specific tasks being 'managed' by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 4, 9, 14, 19, 24 and 29 Primavera teaches a planning system and method wherein the input data includes at least one of the following: risk assessment (Paragraphs 1, 3-4, Page 40; Page 79), bit selection, or drillstring design wherein the data is provided to the corresponding algorithms/logical expressions.

It is noted that the various input data associated with the various tasks merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks being 'managed' by the planning system. Further, the structural elements remain the same regardless of the specific tasks being 'managed' by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 5, 10, 15, 20, 25 and 30 Primavera teaches a planning system and method wherein the results include at least one of the following output data: risk assessment (Paragraphs 1, 3-4, Page 40; Page 79), bit selection or drillstring design.

It is noted that the various results associated with the various tasks merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks being 'managed' by the planning system. Further, the structural elements remain the same regardless of the specific tasks being 'managed' by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 6, 16 and 26 Primavera teaches a planning system and method further comprising (Managing Change, Page 193):

- changing, in response to user input, the one or more input data thereby generating one or more sets of changed input data (Paragraphs 1, 3, Page 9);

- re-executing at least a portion of the one or more sets of instructions using the one or more sets of changed input data thereby generating a second set of results (Paragraphs 5-6, Page 53; Paragraph 1, Page 70); and

- recording or displaying the second set of results (Paragraphs 5-6, Page 53).

Regarding Claims 31 and 45 Primavera teaches a planning system and method wherein the one or more selected tasks comprising a risk assessment task for generating risk information in response to one or more sets of input data (Paragraphs 1, 3-4, Page 40; Page 79).

Regarding Claims 32 and 46 Primavera teaches a planning system and method wherein the set of results for the risk task comprising risk information including individual, subcategory and/or risk categories (Paragraphs 1, 3-4, Page 40; Page 79).

Regarding Claims 33 and 47 Primavera does not expressly teach that the individual risks comprise at least one of the common and well known risks as claimed.

Sriramdas teaches an automatic well planning system wherein the individual risks comprises *at least one of the following* (selected from the group consisting of; Page 52; Table 5.1; Section 5.1.3, Page 51; Figures 3.1, 3.2): H2S and CO2, Hydrates, Well water depth, Tortuosity, Dogleg severity, Directional Drilling Index, Inclination, Horizontal displacement, Casing Wear, High pore pressure, Low pore pressure, Hard rock, Soft Rock, High temperature, Water-depth to rig rating, Well depth to rig rating, mud weight to kick, mud weight to losses, mud weight to fracture, mud weight window, Wellbore stability window, wellbore stability, Hole section length, Casing design factor,

Hole to casing clearance, casing to casing clearance, casing to bit clearance, casing linear weight, Casing maximum overputt, Low top of cement, Cement to kick, cement to losses, cement to fracture, Bit excess work, Bit work, Bit footage, bit hours, Bit revolutions, Bit Rate of Penetration, Drillstring maximum overputt, Bit compressive strength, Kick tolerance, Critical flow rate, Maximum flow rate, Small nozzle area, Standpipe pressure, ECD to fracture, ECD to losses, Gains, Gains Average, Losses, Losses average, Stuck, Stuck average, Mechanical, Mechanical average, Risk Average, Subsea BOP, Large Hole, Small Hole, Number of casing strings, Drillstring parting, or Cuttings.

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, with its ability to be applied to any of a plurality of industries, project types or the like, and to assess and analyze risks would have utilized to manage/plan a well planning (oil drilling, drilling engineering) project in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7) as well as analyze the impact of potential project risks (Primavera: Page 79).

Additionally official notice is taken that the plurality of well planning 'risks' are old and well known to those skilled in the art of drilling engineering and management.

Further it is noted that the plurality of 'risks' merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks risks identified by the planning system. Further, the structural elements remain the same regardless of the specific risks identified planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 34 and 48 Primavera does not expressly teach that the subcategory risk information includes the well planning specific risks as claimed.

Sriramdas teaches an automatic well planning system teaches a planning system and method wherein the subcategory risk information *includes at least one of the following* (Page 52; Table 5.1; Section 5.1.3, Page 51; Figures 3.2, 3.1): gains, losses, stuck pipe and mechanical risks.

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, with its ability to be applied to any of a plurality of industries, project types or the like, and to assess and analyze risks would have utilized to manage/plan a well planning (oil drilling, drilling

engineering) project in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7) as well as analyze the impact of potential project risks (Priamvera: Page 79).

Additionally official notice is taken that the plurality of well planning 'risks' are old and well known to those skilled in the art of drilling engineering and management.

Further it is noted that the plurality of 'risks' merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks risks identified by the planning system. Further, the structural elements remain the same regardless of the specific risks identified planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 35 and 49 Primavera does not expressly teach that the one or more risk categories as claimed.

Official notice is taken that the plurality of well planning 'risks' are old and well known to those skilled in the art of drilling engineering and management. Specifically officially notice is taken that utilizing a plurality of risk categories including at least one of the following: average individual, average subcategory, total, average total, potential risk for each design task and an actual risk for each design task is old and well know.

For example comparing actual to potential/predicted risks and/or averaging risks in a particular group/category are common project management risk analysis and assessment tools used to do such things are identify and mitigate project schedule risks.

It would have been obvious to one skilled in the art at the time of the invention that the automatic well planning system and method as taught by the combination of Primavera and Sriramdas would have benefited from utilizing any of a plurality of risk analysis/assessment tools/approaches including categorizing risks in view of the teachings of official notice; the resultant system/method assisting project managers in identifying and mitigating project risks.

Further it is noted that the plurality of 'risks' merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks risks identified by the planning system. Further, the structural elements remain the same regardless of the specific risks identified

planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 36 and 50 Primavera does not expressly teach that the one or more input data sets include the common and well known well planning specific input data as claimed.

Sriramdas teaches a planning system and method wherein the one or more sets of input data include *at least one of the following* (Sections 5.4.2, 5.4.3, Page 55; Section 5.4.6, Page 57-58): Casing Point Depth, Measured Depth, True Vertical Depth, Mud Weight, Measured Depth, ROP, Pore Pressure, Static Temperature, Pump Rate, Dog Leg Severity, ECD, Inclination, Hole Size, Casing Size, Easting-westing, Northing-Southing,Water Depth, Maximum Water Depth, Maximum well Depth, Kick Tolerance, Drill Collar 1 Weight, Drill Collar 2 Weight, Drill Pipe Weight, Heavy Weight Weight, Drill Pipe Tensile Rating, Upper Wellbore Stability Limit, Lower Wellbore Stability Limit, Unconfined Compressive Strength, Bit Size; Mechanical drilling energy (UCS integrated over distance drilled by the bit), Ratio of footage drilled compared to statistical footage, Cumulative UCS, Cumulative Excess UCS, Cumulative UCS Ratio, Average UCS of rock in section, Bit Average UCS of rock in section, Statistical Bit Hours, Statistical Drilled Footage for the bit, RPM, On Bottom Hours, Calculated Total Bit Revolutions,

Time to Trip, Critical Flow Rate, Maximum I Flow Rate in hole section, Minimum Flow Rate in hole section, Flow Rate, Total Nozzle Flow Area of bit, Top Of Cement, Top of Tail slurry, Length of Lead slurry, Length of Tail slurry, Cement Density Of Lead, Cement Density Of Tail slurry, Casing Weight per foot, Casing Burst Pressure, Casing Collapse Pressure, Casing Type Name, Hydrostatic Pressure of Cement column, Start Depth, End Depth, Conductor, Hole Section Begin Depth, Openhole Or Cased hole completion, Casing Internal Diameter, Casing Outer Diameter, Mud Type, Pore Pressure without Safety Margin, Tubular Burst Design Factor, Casing Collapse Pressure Design Factor, Tubular Tension Design Factor, Derrick Load Rating, Drawworks Rating, Motion Compensator Rating, Tubular Tension rating, Statistical Bit ROP, Statistical Bit RPM, Well Type, Maximum Pressure, Maximum Liner Pressure Rating, Circulating Pressure, Maximum UCS of bit, Air Gap, Casing Point Depth, Presence of H2S, Presence of CO2, Offshore Well, or Flow Rate Maximum Limit.

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized any of a plurality of common 'input data' necessary to manage well planning in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Additionally official notice is taken that the plurality of well planning 'input data' are old and well known to those skilled in the art of drilling engineering and management.

Further it is noted that the plurality of 'input data' merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific input data utilized by the planning system. Further, the structural elements remain the same regardless of the specific input data utilized by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 37 and 51 Primavera does not expressly teach that one of the selected tasks is a bit selection task as claimed.

Sriramdas teaches an automatic well planning system teaches a planning system and method wherein the one or more selected tasks further comprises a bit selection task adapted for generating a sequence of drill bits and other associated data in response to the input data (Section 5.4.8, Page 59).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to bit selection in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

It is noted that the bit selection task merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks managed by the planning system. Further, the structural elements remain the same regardless of the specific tasks managed by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 38 and 52 Primavera does not expressly teach that one of the selected tasks is bit selection or subsequently that the results include the common and well known bit selection results as claimed.

Sriramdas teaches an automatic well planning system teaches a planning system and method wherein the results for the bit selection task are recorded or displaying and including a sequence of drill bits and other associated data (Section 5.4.8, Page 59).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to bit selection in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

It is noted that the bit selection task merely represent non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific tasks managed by the planning system. Further, the structural elements remain the same regardless of the specific tasks managed by the planning system. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 39 and 53 Primavera does not expressly teach that one of the tasks includes bit selection or subsequently that the results include the common and well known bit selection results as claimed.

Sriramdas teaches an automating well planning system and method wherein the results of the bit selection task displayed/recorded includes at least one of the following: Measured Depth, Cumulative Unconfined Compressive Strength (UCS), Cumulative Excess UCS, Bit Size, Bit Type, Start Depth, End Depth, Hole Section Begin Depth, Average UCS of rock in section, Maximum UCS of bit, Bit Average UCS of rock in section, Footage, Statistical Drilled Footage for the bit, Ratio of footage drilled compared to statistical footage, Statistical Bit Hours, On Bottom Hours, Rate of Penetration (ROP), Statistical Bit Rate of Penetration (ROP), Mechanical drilling energy (UCS integrated over distance drilled by the bit),Weight On Bit, Revolutions per Minute (RPM), Statistical Bit RPM, Calculated Total Bit Revolutions, Time to Trip, Cumulative Excess as a ration to the Cumulative UCS, Bit Cost, or Hole Section Name (Section 5.4.8, Page 59).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to bit selection in view of the teachings of Sriramdas; the

resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Regarding Claims 40 and 54 Primavera does not expressly teach drill bit selection or the associaited input data as claimed.

Sriramdas teaches an automated well planning system and method wherein the input data sets for the bit selection task include *at least one of the following*: Measured Depth, Unconfined Compressive Strength, Casing Point Depth, Hole Size, Conductor, Casing Type Name, Casing Point, Day Rate Rig, Spread Rate Rig, and Hole Section Name (Section 5.4.8, Page 59).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to bit selection in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Regarding Claims 41 and 55 Primavera does not expressly teach a drillstring design task as claimed.

Sriramdas teaches an automated well planning system and method wherein the one or more selected tasks comprising a drillstring design task adapted for generated a summary of drillstring in each hole of a wellbore in response to the input data (Section 5.3.13, Page 65).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to drillstring design in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Regarding Claims 42 and 56 Primavera does not expressly teach that one of the tasks include drillstring design as claimed.

Sriramdas teaches an automated well planning system and method wherein the results for the dirllstring design task comprising a summary of a drillstring in each hole section of a wellbore (Section 5.3.13, Page 65).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks

including but not limited to drillstring design in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Regarding Claims 43 ad 57 Primavera does not expressly teach that the tasks include a drillstring tasks as claimed.

Sriramdas teaches an automated well planning system and method wherein the results for the drillstring design task include at least one of the following: Hole Section Begin Depth, Drill Collar Length, Drill Collar Weight, Drill Collar , Drill Collar 0D, Drill Collar ID, Drill Collar 2 Length, Drill Collar 2 Weight, Drill Collar 2, Drill Collar 20D, Drill Collar 2 ID, Heavy Weight Length, Heavy Weight Weight, Heavy Weight, Heavy Weight OD, Heavy Weight ID, Drill Pipe Length, Drill Pipe Weight, Pipe, Pipe OD, Pipe ID, Drill Pipe Tensile Rating, BHA tools, Duration, Kick Tolerance, Drill Collar Linear Weight, Drill Collar 2 Linear Weight, Heavy Weight Linear Weight, Drill Pipe Linear Weight, DC OD, Drill Collar ID, Drill Collar Linear Weight, HW OD, HW ID, HW Linear Weight, Drill Pipe OD, Drill Pipe ID, or Drill Pipe Linear Weight (Section 5.3.13, Page 65).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to drillstring design in view of the teachings of Sriramdas; the

resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Official notice is taken that the plurality of results from the drillstring design task are old and well known to those skilled in the art at the time of the invention wherein such information is commonly created during drillstring design as well as utilized for well planning and/or management.

Further it is noted that the various drillstring results data related to the drillstring design task merely represents non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific drillstring intput data utilized as part of the drillstring design task. Further, the structural elements remain the same regardless of the specific drillstring intput data utilized as part of the drillstring design task. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Regarding Claims 44 and 58 Primavera does not expressly teach that one of the tasks includes drillstring task as claimed.

Sriramdas teaches an automated well planning system and method wherein the one or more input data sets for the drillstring design in includes at least one of the following: Measured Depth, True Vertical Depth, Weight On Bit, Mud Weight, Mud Weight Measured Depth, Inclination, Casing Point Depth, Hole Size, Footage, Rate of Penetration, Time to Trip, Dog Leg Severity, True Vertical Depth, Pore Pressure without Safety Margin, Bit Size, Upper Wellbore Stability Limit, Lower Wellbore Stability Limit, Openhole Or Cased hole completion, BOP Location, Casing Type Name, Hole Section Name, Conductor, Start Depth, End Depth, On Bottom Hours, Statistical Drilled Footage for the bit, Cumulative UCS, Casing Point, Casing Size, Casing Burst Pressure, Casing Collapse Pressure, Casing Connector, Casing Cost, Casing Grade, Casing Weight per foot, Casing Outer Diameter, Casing Internal Diameter, Air Gap, Casing Top Measure Depth, Water Depth, Top of Tail slurry, Top Of Cement, Mud Volume, or Offshore Well (Section 5.3.13, Page 65).

It would have been obvious to one skilled in the art at the time of the invention that the planning system and method as taught by Primavera, would have utilized been utilized to manage any of a plurality of well known well planning and management tasks including but not limited to drillstring design in view of the teachings of Sriramdas; the resultant system/method enabling users to successfully/effectively manage well planning/drilling tasks/activities (Srirmadas: Paragraph 2, Page 7).

Official notice is taken that the plurality of drillstring input data including the combination of the drill pipe, the bottom hole assembly and any other tools used to make the drill bit turn at the bottom of the wellbore) input data related to drillstring design are old and well known to those skilled in the art at the time of the invention wherein such information is commonly used in drillstring desig as well as well planning and/or management.

Further it is noted that the various drillstring input data related to the drillstring design task merely represents non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific drillstring intput data utilized as part of the drillstring design task. Further, the structural elements remain the same regardless of the specific drillstring intput data utilized as part of the drillstring design task. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re Gulack, 703 F.2d 38, 385, 27 USPQ 40, 404 (Fed. Cir. 983); In re Lowry, 32 F.3d 579, 32 USPQ2d 03 (Fed. Cir. 994); MPEP 206.*

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Chau et al., U.S. Patent No. 6,438,495, teach an automated well planning system and method.

- Ayan et al., U.S. Patent Publication No. 2005/0119911, teach a system and method for well planning.

- Oliver, Complete planning for maintenance turnarounds will ensure success (2002) teaches an well planning system and method comprising task management.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SCOTT L. JARRETT whose telephone number is (571)272-7033. The examiner can normally be reached on Monday-Friday, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Van Doren Beth can be reached on (571) 272-6737. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Scott L Jarrett/
Primary Examiner, Art Unit 3623

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	Applicant(s) Hans Eric Klumpen et al	
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U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	NO

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		SPE/IADC 67816 "Meeting Future Drilling Planning and Decision Support Requirements" Copyright 2001, 27 February-1 March 2001

EXAMINER /Scott Jarrett/	DATE CONSIDERED 05/19/2008

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Notice of References Cited	Application/Control No. 10/802,622	Applicant(s)/Patent Under Reexamination KLUMPEN ET AL.	
	Examiner SCOTT L. JARRETT	Art Unit 3623	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,438,495	08-2002	Chau et al.	702/9
*	B	US-2005/0119911	06-2005	Ayan et al.	705/001
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Sriramdas, Srinivas, Systems Analysis of Drilling Engineering and Management To Design a Relational Database University of SouthWestern Louisianna, Spring 1998
	V	Primavera Project Planner Planning and Control Guide Version 3.0 Primavera Systems, 1999
	W	Oliver, Rod, Complete planning for maintenance turnarouds will ensure success Oil & Gas Journal, Vol. 100, No. 17, April 29, 2002
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Complete planning for maintenance turnarounds will ensure success
Rod Oliver
Oil & Gas Journal; Apr 29, 2002; 100, 17; ABI/INFORM Global
pg. 54

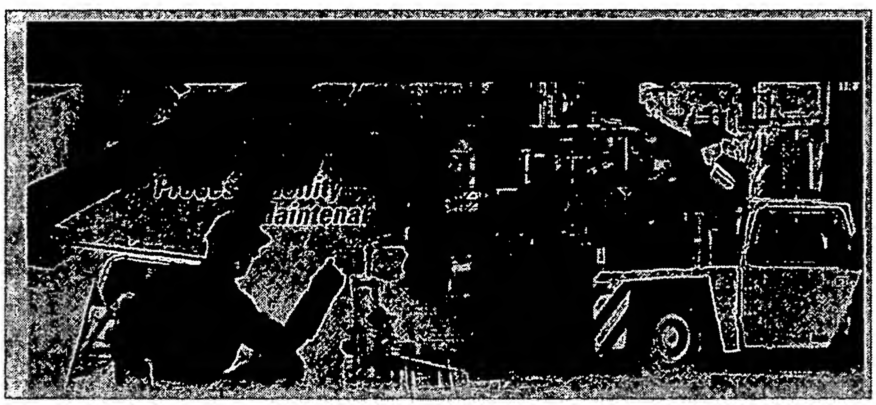
Plant turnaround is no longer a single occurrence that is the responsibility of the maintenance department. Organizations readily accept the need for multifunctional teams responsible for the planning process, as well as the need to follow a business work process during turnaround planning and execution.

omplete planning for maintenance rnarounds will ensure success

Rod Oliver
Meridium Inc.
Roanoke, Va.

Defining the work process, however, can be a challenge. Many organizations have adapted a generic process and applied it to the local environment. In theory and, fortunately, in practice, a good generic process is suitable for overhauling different types of plants and equipment, irrespective of industry.

Simply classifying turnarounds as "other projects" is a common mistake. They have many things in common with all projects, but the nature of repair work typically sets them apart from other projects. Despite the considerable



improvement in techniques for predicting equipment condition, there is still an element of discovery when one opens the equipment for cleaning and inspection.

Turnaround execution tends to be more concentrated than construction projects. Turnarounds typically have their own challenges. For example, decisions are based on actual equipment condition despite the increasing accuracy of predicted conditions and corrosion rates.

The work process for planning a turnaround, therefore, must address the specific needs and challenges that are part of repairing process equipment.

Following the process is essential, but another important consideration are the benefits that technology can provide. Web-based technology can help organize and control the tasks, information, and issues critical to efficient turnaround management.

Turnaround cycle

Recognizing that a process is ongoing is the first step in defining that process; completion of one turnaround is the next cycle's starting point. Demobilization of people and equipment often occurs when the plant returns to production with on-spec products.

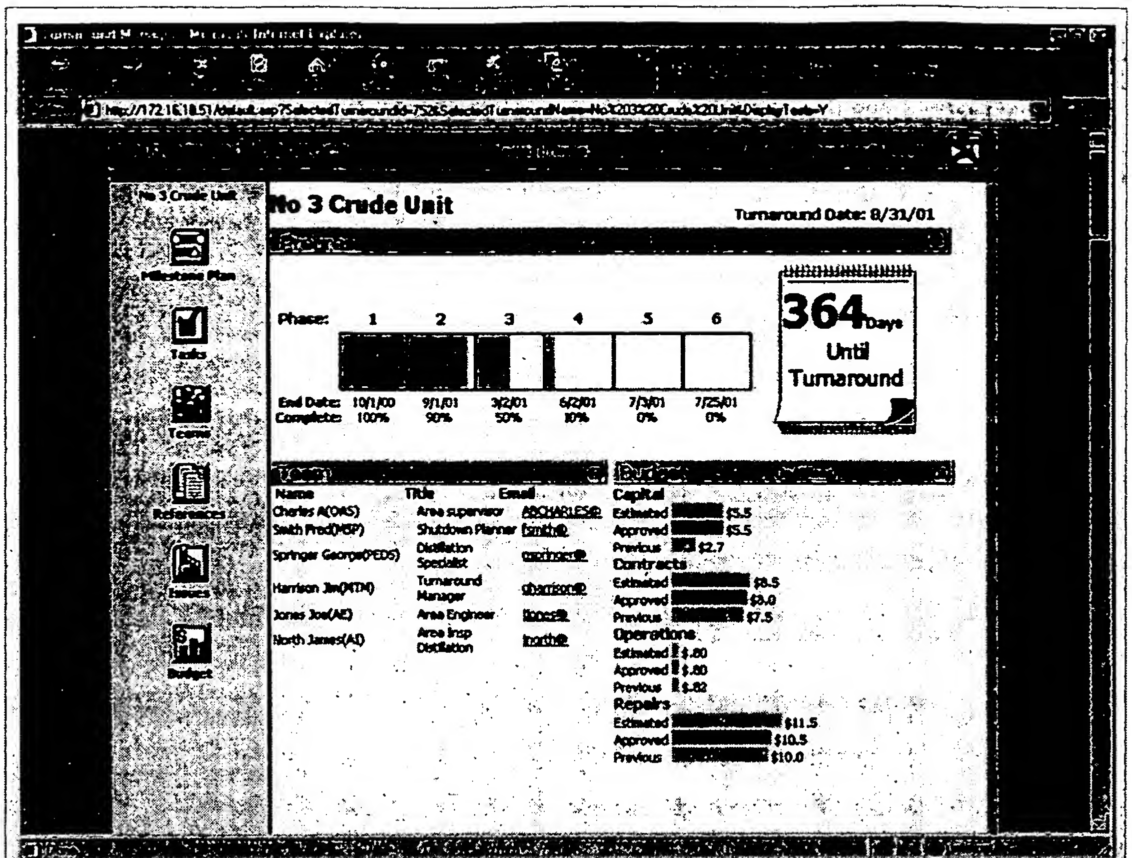
While this is certainly true for a majority of the workforce, those who make up the planning team must remain in place to ensure that records are complete and that lessons learned are carried forward to the next outage.

Any work process must be a part of the company's overall business plan to ensure that it reflects the current needs of the constantly changing business environment. The work process should also reflect the fact that the planning activities' focus changes depending upon the stage in which the team is engaged (Fig. 1).

Fig. 2 depicts a high-level breakdown of these activities.

Many feel that the work process, starting immediately after completion of the last turnaround, will require considerably more effort and planning manpower than if it started closer to the actual turnaround date. This is not necessarily the case.

If a given number of activities must be accomplished in the planning process, it is often more efficient to perform them over a longer period of time rather than rushing to complete them in the few months immediately before the turnaround.



Web-based project control tool provides a plant-wide turnaround information system (Fig. 1).

Turnaround teams

Organizations recognize the need for multifunctional or disciplined teams to handle the diverse activities of the planning process. This is a practical way to ensure that the disparate requirements of all those who contribute to the turnaround are reflected in the final plan.

The facts that such teams require leadership and guidance and that working as a team raises it own challenges are not always recognized. Self-directed teams often proceed in self-directed paths, which can conflict with corporate or plant requirements.

Many organizations provide guidance to these teams through a steering committee. This committee oversees progress and ensures that team efforts are channeled down the right path. In addition, they can easily stay informed about corporate, managerial, and operational decisions that will influence specific turnarounds.

Core team

Appointing a core team to handle the planning process is a monumental milestone in the process, but this is just the first step.

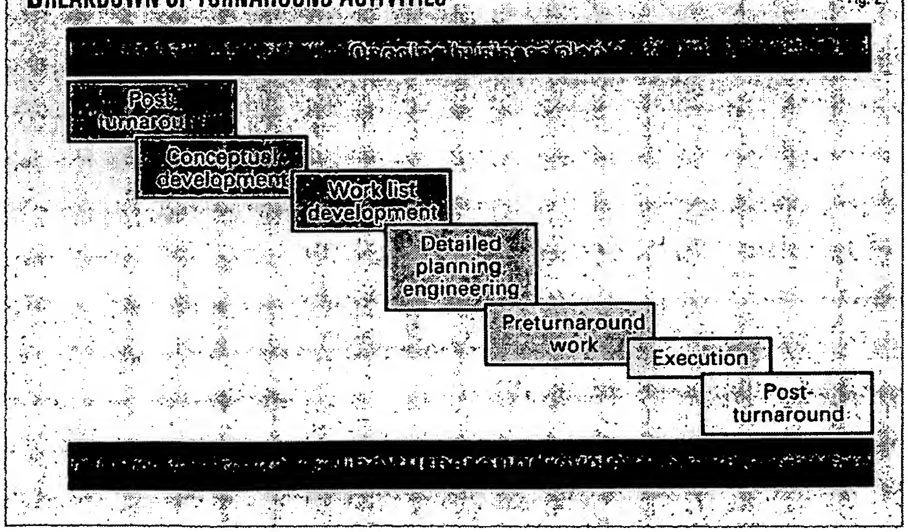
Working as a member of a team does not always come naturally to individuals whose traditional roles and responsibilities have been based on functional and departmental requirements.

When naming members of a core team, the organization should assess the members' abilities to work within a team and, where needed, give them appropriate training. Not everyone, however, can be taught the skills needed to be an effective team member. Not everyone is suited to being a team player. They are not ineffective—their individual talents are simply best used outside a team environment.

The challenge does not only lie with team members. Those who appoint individuals to the team frequently have difficulty delegating authority along with responsibility. Avoid this "pass everything by me" syndrome to have an effective team. Team members must clearly understand that decisions are made by the team and not by individuals within the team.

Core team roles fall into two categories: those common to all members and those that depend on the individual

BREAKDOWN OF TURNAROUND ACTIVITIES Fig. 2



functionality of the team member.

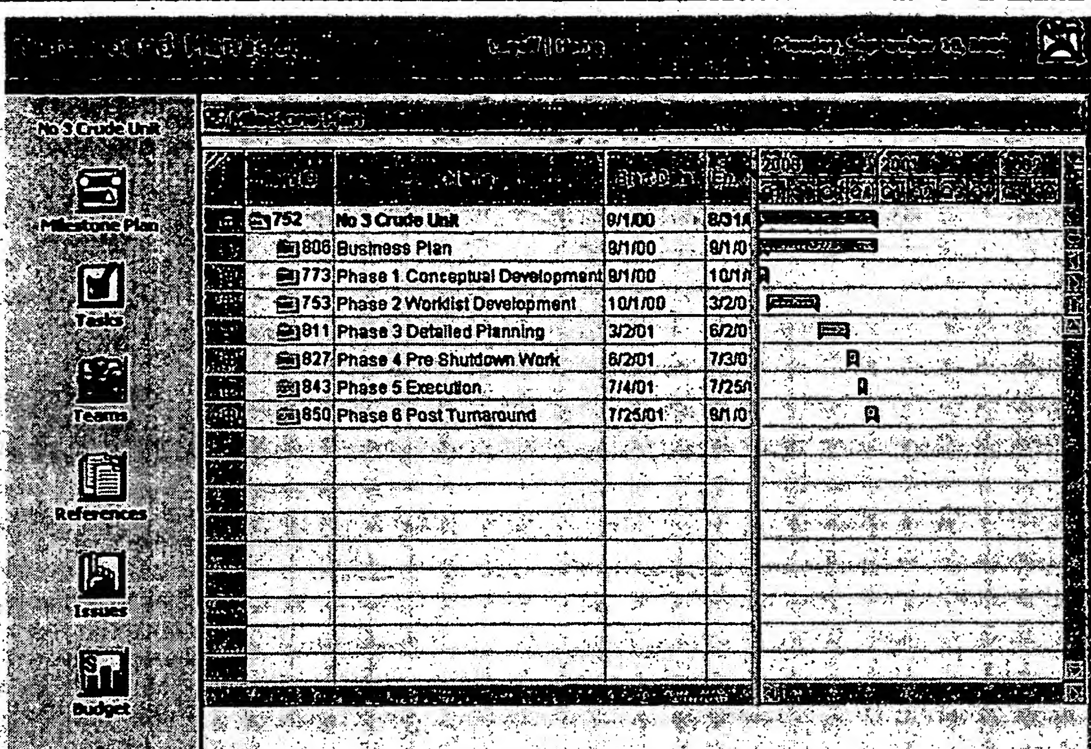
The core team must have a functional leader or facilitator who has responsibility for assessing the timing for issues that need resolution, ensuring that meetings are scheduled, and maintaining links with the steering committee. This assignment can vary with the type of turnaround or with the process stage. In some organizations, department representatives lead the team until the preshutdown work starts, whereupon the maintenance representative will take the lead.

Turnaround steering committee

The members of this team typically consist of the facility's senior management. This group provides direction and guidance to the core team to ensure that the turnaround meets business needs. A more important function of this committee, however, is to ensure that the turnaround's scope and budget are aligned.

Management often appears to set unrealistic budget expectations. Frequently, however, what appears to be a poor decision is, in fact, appropriate based on information available. The work process must, therefore, ensure that there is communication between the core team and the steering committee. The committee must keep abreast of the scope of work and current estimated costs of execution.

Better information quality will enhance the discussions and subsequent decisions. This will not solve all the budget problems, but without a regular review of scope and budget alignment, there will be little opportunity to resolve any differences.



The work process translates into a series of tasks that form the milestone plan (Fig. 3).

Reviews or audits

Conducting a series of reviews or audits at intervals throughout the process will ensure that planning and execution are receiving appropriate priority. Reviews typically coincide with completion of each specific stage.

Individuals that undertake such audits are appointed by the steering committee and should be knowledgeable in turnaround matters but should not have direct responsibilities for the turnaround under review. Include someone from outside the plant or organization for some, if not all, of the audits.

The two most important audits are performed after the conceptual development and detailed planning stages. The former reviews the turnaround strategy and basic resources needed to meet the turnaround objectives. In contrast, the audit after completion of detailed planning is important since it is the final opportunity to estimate an organization's preparedness, while also allowing some time for changes if needed.

Audits review a team's progress compared to the projected milestone schedule using group discussions, document reviews, site visits, and meetings.

The audit team should publish and discuss a brief report with the core team and steering committee.

Milestones; business plan

Each turnaround has its own milestone schedule that details the timing of each stage and the individual tasks within each stage. This tool secures commitments from individuals or completes tasks or supplies data and information and is the primary means of measuring planning progress (Fig. 3).

Setting a long-range business plan is ongoing and establishes the long-range schedule and budgets for turnarounds and integrates them into the overall corporate plan. The steering committee is typically responsible for these activities. During the process, it considers and reviews these data and activities:

- Marketing strategy.
- Plant or unit performance data (both present and anticipated).
- Inventory capacities.
- Scheduled inspection compliance requirements.
- New regulations and standards.
- Improvement plans.
- Benchmarking results and findings.
- Market conditions.
- Inter-plant or facility coordination.
- Capital or investment planning.

- Individual plant or unit mechanical performance.
- Regulatory and legal requirements.
- Turnaround timing to ensure minimal lost profit opportunities.
- Value of downtime.
- Evaluation of which plants or units to shutdown at the same time.

The long-range business plan deliverables should include:

- A 5-year rolling turnaround schedule.
- An annual turnaround schedule.
- Forecasted turnaround budget for the next 5 years (both expense and capital).
- Long-range improvement plans.

The long-range business plan is an ongoing process. The present-day business environment in which raw material costs, product prices, and demand can change rapidly makes it inevitable that long-term plans will change. Turnaround schedules must be flexible to respond to these changes.

Turnaround conceptual development

This stage begins immediately after the postturnaround stage of the previous cycle and within the framework of the long-term business plan.

Each turnaround core team should have functional representatives. The team and steering committee should meet to define clearly the groundwork for the upcoming turnaround.

The team should consider: the type of turnaround; whether it will be restricted to activities such as catalyst change, significant capital items, and time until the next turnaround; and other factors affecting the work content. This will define the turnaround philosophy.

The core team can now concentrate on the activities for this stage:

- Form the core team and define responsibilities.
- Define turnaround philosophy and goals.
- Review previous turnaround history.
- Review lessons learned from past turnarounds.
- Identify sources of work input.
- Establish major work items, both expense and capital.
- Establish the value of plant or unit lost production.
- Develop work list criteria based on the philosophy.
- Recognize hazardous operations ("HazOp") and reliability requirements.
- Review process plant performance, past and present.
- Develop contractor strategy.
- Create front-end loading strategy.
- Develop cost control and tracking process.

The conceptual development deliverables include:

- Turnaround philosophy.
- Preliminary work list.
- Basic cost estimates (±30%).
- Estimated duration.
- Turnaround preparation milestone plan.
- Manpower forecast for turnaround

planning resources.

- Organization structure.
- Quality assurance, quality-control requirements.
- Stage report and audit schedule.
- Milestone plan.

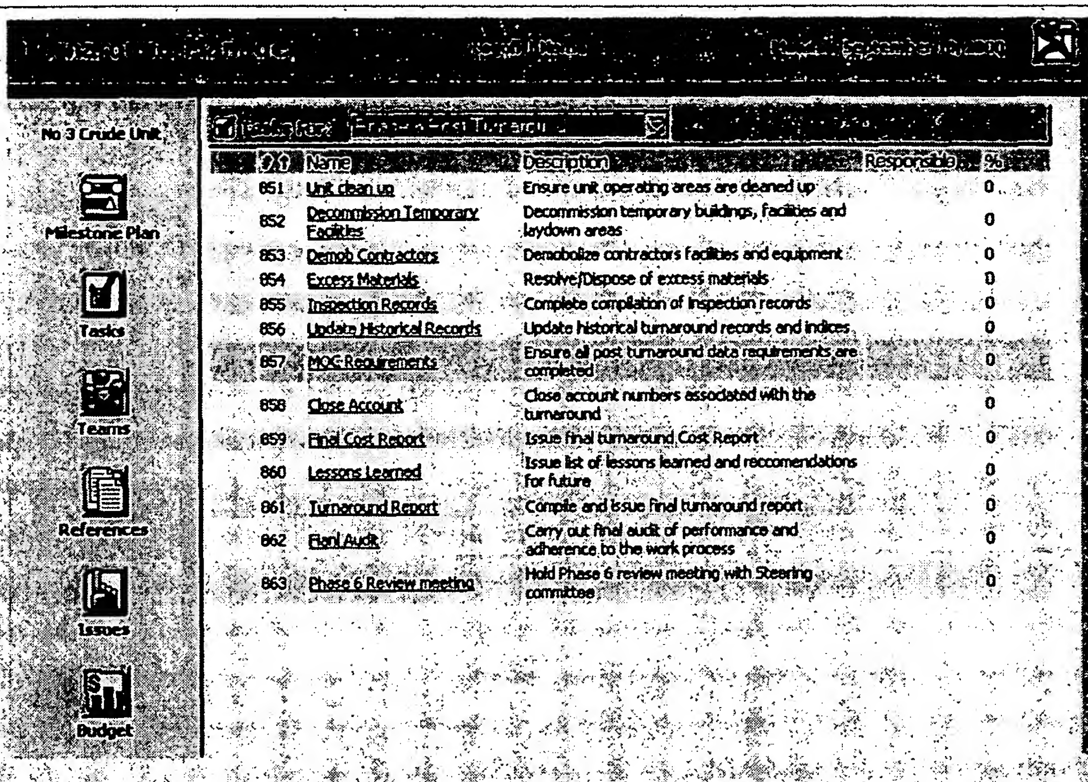
At the end of this stage, deliverables are presented to the steering committee for guidance and agreement. The philosophy is formalized and signed by all core team members, as well as the preliminary work list used to establish a cost estimate for the turnaround, usually ±30%.

Another critical deliverable is the milestone plan. It lists the key checkpoints and delivery dates for the planning cycle and forms the basis for forecasting planning resources. It forms the commitment schedule for all functions.

The audit schedule is an integral part of the milestone plan. Together with the work process, it provides the basis for measuring progress.

The steering committee and core team should establish an agreement before proceeding to the next stage. This is how the turnaround's scope aligns with the budget. This is a critical aspect of turnaround success. If the scope does not align initially, then one should note exceptions, rework plans, and resolve differences before proceeding to the next stage.

This stage is usually short (2-3 months) and, for major turnarounds, is typically completed 4-6 months after the previous turnaround. Even for smaller turnarounds with no major material lead times, this stage should start immediately after the last turnaround, although completion of this stage can be 12-15 months before starting the next turnaround.



Tasks can be sorted by any attribute (Fig. 4).

Turnaround work development

During this stage, all work list inputs are gathered and assembled while the organization and schedule continue to develop. Continuous maintainability, reliability, and constructability input, combined with reviews of the work list criteria and philosophy, ensure that the scope of work is focused.

All work list proposals must pass through the core team for review and impact assessment. The core team's activities should focus on:

- Firming of all turnaround work inputs which include:
  1. Risk-based inspection and reliability items.
  2. Capital works.
  3. Compliance items.
  4. HazOp study outputs.
  5. Operational requirements.
  6. Process engineering requirements.
  7. Environmental, safety, and health needs.
  8. Maintenance requirements.
- Maintainability, reliability, and constructability reviews.
- Resolution of conflicting needs.
- Long lead-time material procurement.

Work development deliverables include:

- Integrated plan (schedule, equipment, and resources).
- Preliminary critical path schedule.
- Refined budget estimate (±20%).
- Updated preliminary and approved work list.
- Long lead-time materials ordered.
- Critical lift plans.
- An additional work approval process.
- Work scope closed.
- Stage report.
- Review or audit report.

As work is defined, the critical path schedules are generated to evaluate alternative execution methods. This will ensure that the most cost-effective approach to minimum downtime is used.

Again, at the end of this stage, the core team presents these deliverables to the steering committee for guidance and buy in. The next stage is started once everyone agrees to this stage.

This stage should be completed 12-15 months before the shutdown.

Turnaround detailed planning

This is the point at which detailed

planning occurs. This stage helps ensure that all necessary work during the turnaround is incorporated and integrated into the plan. This should include all capital work and the operational shutdown and startup sequences.

The work must be integrated; failure to do so will cause the turnaround to overrun both budget and duration. This does not necessarily mean that responsibility for execution must be integrated. This depends on the turnaround's complexity and nature.

The turnaround execution team typically handles internal equipment modifications and unit piping changes. Major plant modifications in which the work can be easily separated can be handled by a project organization.

The core team has the responsibility to ensure that the impact of all work is understood and fully integrated into the plan.

The work list should be finalized 4-6 months before the shutdown date; a key role of the core team is to ensure that this happens. The core team establishes cut-off dates for turnover of capital items that must be adhered to. This ensures an opportunity to demonstrate what influence this work will have on the overall plan. This final work list is the basis for the final budget estimate that should now be ± 10%.

On stream inspection activities are closing at this time to ensure that the results are interpreted and appropriate action integrated into the plan.

A work process must be in place to control, review, and, if appropriate, approve additional work that arises after the work list is finalized. This additional work could be an oversight or that which arises during execution.

During this stage, the core team's activities should focus on:

- Final work list.
- Final plan for equipment cleaning and personnel entry.
- Contracting plan in place and all major contracts let.
- Critical-path schedule.
- Detailed execution plans.
- Detailed safety plan.
- Additional work approval process.
- Turnover of all capital work.
- Completion of materials procurement plan.
- Final estimate.
- Definition of format and frequency of performance and progress reports.

The detailed planning deliverables include:

- Integrated execution plan (finalized on critical and sub-critical work).
- Final budget estimates (±10%).
- Final work list.
- "What if" scenarios.
- Lifting plans.
- Mobile equipment requirements.
- Detailed shop loading plans.
- Review or audit report.

The core team presents these deliverables (primarily the execution plan and budget estimate) to the steering committee. The budget is the best estimate based on the finalized work list and execution plan that the core team develops.

A sound estimating methodology for turnarounds includes a provision for contingencies. Estimates should forecast expected costs, not match a preset budget. If the budget and scope are not in alignment, then one or the other must be changed.

The audit function at the end of this stage is the most critical because it is the last realistic opportunity to take action that will affect the turnaround's outcome. If possible, the audit team should include "out-of-plant" personnel to ensure that a conflict of interest does not occur. The audit team presents the results to the core team and steering committee, which should then jointly agree upon any necessary corrective action.

It is essential to complete this detailed planning stage 4-6 months before the turnaround.

Preturnaround work

This stage occurs right before full-scale execution. Preturnaround work focuses on training and orientation needs, mobilization, final execution plans, and preshutdown work. Operations, maintenance, and contractors must be completely aligned. This is an opportunity for all parties to understand the work to be done, the sequence and details of the shutdown process, and to prepare for entry.

During this stage, the core team's activities should focus on:

- Safety plan implementation.
- Operations training.
- Maintenance and contractor training and orientation.
- Team building.
- Environmental, safety, and management of change (MOC) requirement review.
- Beginning the prefabrication work.
- Beginning the on-site pre-shutdown work.
- Detail of shutdown and unit clean-out sequences.
- Prepare temporary connections.
- Identify blind locations and hang the blinds.
- Install temporary offices, stores, and tool houses.
- Mobilize the execution team.
- Cost tracking and reporting.
- Detailed execution plan.
- Shutdown and clean-out plan.
- Work performance.
- Turnovers.
- Start-up plan.

The preturnaround deliverables include:

- Final execution plan.
- Completion of preshutdown turnaround work.
- Training the execution team.
- Developed turnaround organization charts.
- Creation of a reporting plan.
- Completion of field mobilization.
- Finalized shutdown meeting procedures.
- Beginning of communications-alignment meetings.
- Review or audit report (optional).

Mobilization includes all aspects of the logistics involved with the temporary workforce increase. Training should ensure that personnel can operate and maintain new equipment or facilities that are installed.

Communication is important to the turnaround and can influence success. In addition to being a means of advising personnel on logistical matters, items such as turnaround newsletters and flyers can also communicate overall progress.

This stage should be completed 2 weeks to 3 months before the turnaround.

Turnaround execution

During this stage, the core team's focus moves from planning to execution. The individual responsible for execution should assume leadership of the team. This stage begins as feed is reduced and includes shutdown, preparation for entry, work execution, and start-up, all of which should be covered in the detailed plan.

During execution, the core team's activities should focus on:

- Unit and equipment shutdown and preparation for entry.
- Daily turnaround meetings.
- Schedule reviews and updates.
- Daily cost tracking and reporting.
- Documenting MOC requirements.
- Additional work review and processing.
- Tracking additional work and scope changes.
- Ensuring that records reflect as-found conditions.
- Documenting all repairs.
- Documenting all inspections.
- Prestart-up safety review.

Execution deliverables include:

- Turnaround executed per the plan.
- Objectives met.
- Contingency plans reassessed as needed.
- Prestart-up safety review.
- Start-up on schedule.
- Release to operations.

An important aspect of execution—control of scope—consists of two elements:

- Additional work requests. This covers obvious oversights from the work list and work that becomes apparent during execution, such as unanticipated replacement of equipment internals. This work must follow an additional work approval process, although the daily shutdown meeting can resolve this process.
- Scope growth of identified work list items. This category includes items such as "replace six trays" becoming "replace nine trays." Although this represents additional work, it is not outside the work list's scope. Typically some allowance for these contingencies is made in the estimates. Scope growth should be documented for cost control purposes but does not necessarily have to pass through the additional work-approval process (Fig. 4).

A key aspect of execution is a daily shutdown meeting. It is essential to limit attendance at these meetings. Typically, only the core team should attend on a regular basis. The meetings should be brief and concentrate on resolving work scope changes.

This stage is complete when the plant is started up and producing on-specification product.

Postturnaround

This stage covers demobilization, documentation, cost reports, and most importantly, lessons learned that could be carried forward to the next turnaround. Executing this stage in a timely manner with a quality result will depend on data collection effectiveness during the execution stage.

It is vital that the core team have the time to complete this aspect of their re-

PERFORMANCE CRITERIA — Table 1

Criterion	Description
Duration	Oil out to on-spec product, days or day/year
Total cost	Turnaround and routine maintenance
Turnaround costs	Actual and annualized by plant function
Frequency	Run length, months
Predictability	Actual vs. planned work hours, duration and cost
Safety	Accident number and rates
Start-up incidents	Days lost due to rework
Unscheduled shutdowns	Days lost during the run
Mechanical availability	Time available, %
Additional work	Actual vs. contingency
Environmental incidents	Impact of incidents attributable to a shutdown
Savings	Money saved resulting from changes to above indices

sponsibilities. Successful completion of this stage can have a major impact on the next turnaround.

During the postturnaround stage, the core team's activities should focus on:

- Demobilization of contractors.
- Post-turnaround unit and lay-down area clean up.
- Resolution and disposal of excess material.
- Repair and inspection history reports.
- Updating the turnaround historical database.
- Postturnaround MOC requirements.
- Freezing the turnaround accounts.
- Issuing the final cost report.
- Lessons learned and recommendations for future turnarounds.
- Preparing the final turnaround report.

The deliverables include:

- Postturnaround unit and lay-down area clean up.
- Planned run length.
- Improvement opportunities.
- Final reports.
- Final audit report of performance and adherence to the work process.

This stage should be completed 1-2 months after the turnaround.

Performance measure; success

The organization must measure turnaround performance and observe trends. As with all measurements, a single indicator can mislead. It is, therefore, necessary to design a number of criteria to provide a balanced indication of performance. Table 1 lists some suggested criteria.

Having a work process does not guarantee a successful turnaround, but benchmarking considerably reduces the likelihood of failure. Organizations that complete turnarounds on time, on budget, and without surprises invariably have a defined work process and adhere to it.

Following the process is the key; today's technology provides tools that allow organizations to specify the process, define the tasks, and measure adherence. Web-based technology is an ideal medium to organize and control the multitude of tasks, information, and issues that are critical to the successful completion of turnarounds. ✦

The author

Rod Oliver is a senior consultant for Meridium Inc., Roanoke, Va., with more than 30 years' experience in the refining and process industries. Oliver has worked in refineries in the Middle East, the Philippines, Korea, and Malaysia as well as in corporate offices in the UK and US. He has held a variety of managerial positions in the maintenance, engineering, inspection, and general management fields. Before his current consulting position with Meridium, Oliver was responsible for providing instruction on maintenance and reliability best practices throughout a major international oil company.

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